Kettle Moraine State Forest - Mukwonago River Unit
Lulu Lake State Natural Area
Regional and Property Analysis

July, 2013

Wisconsin Department of Natural Resources
Bureau of Parks and Recreation – Division of Lands

TABLE OF CONTENTS

LIST OF TABLES

LIST OF MAPS

INTRODUCTION

SIGNIFICANCE OF THE RPA IN THE MASTER PLANNING PROCESS

The purpose of the Regional and Property Analysis (RPA) is to provide baseline information on the properties as well as information on how each property fits into or relates to its larger ecological and social context. The RPA serves as an important source of information for later steps in the master planning process (NR 44). The RPA is prepared during the first phase of the planning process as a stand-alone companion to the master plan. The RPA is organized into four components: Introduction, Regional Assessment, Property Assessments, and Findings and Conclusions.

Regional Assessment

- Provides an overview of the current socio-economic, cultural, ecological, and recreational environments in the region and how those affect the physical and use aspects of the properties.
- Identifies significant ecological and recreational needs within the planning region.
- Defines existing and potential social demands or constraints that affect each property that should be considered during the planning process.

Property Assessments

- Provides an overview of the existing conditions on each property, including natural resources, recreational use and facilities, and adjacent land use.
- Describes how the existing conditions relate to management opportunities and needs.

Findings and Conclusions

- Uses the information from the regional and property assessments to draw conclusions about each property's niche, and serves as the basis for the draft Vision Statement and Property Goals.

Combined, these sections consider the economic, ecological, and social conditions, opportunities, and constraints associated with the properties on a local and regional scale. State Forest master planning goes beyond forest management, spanning a wide range of issues and uses. Examining the roles these properties play in southeast Wisconsin will contribute to sound, long-term planning.

DESCRIPTION OF THE PROPERTIES AND REGION

Mukwonago River Unit (MRU)

As part of the Kettle Moraine State Forest (KMSF), current State ownership of the Mukwonago River Unit encompasses a total of 968-acres (See Map A). The property surrounds Rainbow Springs Lake and is approximately 0.75 miles wide and 2.0 miles long. It extends north of the Mukwonago River and stretches south to Co Hwy/Co Rd J. The MRU spans across both Walworth and Waukesha Counties.

In the late 1960s, the property was partially developed as a golf course/resort facility. An incomplete hotel was destroyed by fire in 2003. The remainder of the property is relatively undeveloped with a mix of oak savanna, oak/central hardwood forest, wetlands and pine plantations. In 2008, the State approved acquisition of the property for resource protection and outdoor-based public recreation purposes.

According to the Proposed Land Acquisition of the Mukwonago River Unit (File # SF-1491), a recommendation from the Land Legacy report indicated that this basin is a priority area for preservation. The main property surrounding Rainbow Springs is located in the Mukwonago River Watershed and contains many headwater springs supporting the high water quality and species diversity found in the basin. Jericho Creek and Beulah outlet are the two significant

tributaries that flow into the Mukwonago River. The inclusive portion of the Mukwonago River flows west to east downstream from Eagle Spring Lake, into Lower Phantom Lake and discharges into the Illinois Fox River. The Mukwonago River is one of the most biologically diverse systems supporting 58 different fish species and a number of mussel species. Also adjacent to the Southern Unit of the Kettle Moraine State Forest and Vernon Marsh State Wildlife Area, the Mukwonago River Watershed is surrounded by many wetlands with tall grass prairie and oak savanna. This region provides habitat for wetland-associated, migratory, and endangered bird species.

Close proximity of the Mukwonago River Unit to Wisconsin population is of importance. The state forest is located only 35 miles west of Milwaukee, and is accessible within 100 miles for about five million people. The restoration and conservation project will result in all-season access of the property. The MRU is an important location for providing accessibility and possesses an abundance of natural resources. Through its healthy wetlands and river ecosystems, the MRU offers exceptional outdoor recreation benefits for public enjoyment among a diversity of wildlife.

Purpose of State Forests

State Forests are managed in accordance with Wis. Stat. s. 28.04 to assure sustainably managed forests that provide ecological, social, and economic benefits for present and future generations. The purposes and benefits of state forests are outlined in Wis. Stat. s. 28.04 (2):

a) The department shall manage the state forests to benefit the present and future generations of residents of this state, recognizing that the state forests contribute to local and statewide economies and to a healthy natural environment. The department shall assure the practice of sustainable forestry and use it to assure that state forests can provide a full range of benefits for present and future generations. The department shall also assure that the management of state forests is consistent with the ecological capability of the state forest land and with the long-term, maintenance of sustainable forest communities and ecosystems. These benefits include soil protection, public hunting, protection of water quality, production of recurring forest products, outdoor recreation, native biological diversity aquatic and terrestrial wildlife, and aesthetics. The range of benefits provided by the department in each state forest shall reflect its unique character and position in the regional landscape.

b) In managing the state forests, the department shall recognize that not all benefits under par. (a) can or should be provided in every area of a state forest.

c) In managing state forests, the department shall recognize that management may consist of both active and passive techniques.

Mukwonago River Unit is a Southern Forest as defined in Wis. Admin. Code s. NR 45.03(21). Southern Forests are administered by the Bureau of Parks and Recreation.

Lulu Lake State Natural Area

The Lulu Lake SNA is also located in the Kettle Moraine region of southeast Wisconsin (See Map A). The 1,848 acre property (which includes the 633 acre Nature Conservancy easement) extends downward from the southern shore of Eagle Spring Lake and surrounds Lulu Lake. The Lulu Lake SNA property is bordered to the south and east by County Highways E and J. There are also stepped sections which run southwest from Eagle Spring Lake. The Nature Conservancy owns two parcels of the Lulu Lake SNA that are west of Lulu Lake. The interconnected nature of Conservancy and DNR lands requires a high level of coordination in managing this combined natural area. Similarly, the Mukwonago River flows from the Lulu Lake SNA through the Mukwonago River Unit providing a close relationship in terms of proximity and riverine connectivity. Private parcels located within and near the Lulu Lake SNA means that it is less contiguous than the Mukwonago River Unit. The Lulu Lake SNA spans across both Walworth and Waukesha County.

The Lulu Lake SNA has been known as a significant research area for several decades and provided data for John Curtis' influential 1959 book "Vegetation of Wisconsin." Lulu Lake was designated a State Natural Area in 1977 due to the quality of the land as a habitat for the diverse wetland and upland wildlife communities which have been virtually eliminated from southeastern Wisconsin. The 95 acre Lulu Lake is exceptionally clear and possesses an unusual number of fish species. The Lulu Lake SNA contains open stands of oak trees, a natural phenomenon which

is increasingly rare in Wisconsin. Calcareous fens, the rarest type of wetland in Wisconsin, provide a habitat for plants that tolerate the calcium and magnesium derived from the underlying dolomite bedrock. Lulu Lake SNA also has good examples of dry prairies and dry oak forests. Altogether, Lulu Lake provides an intermingled set of wildlife communities which are rare or uncommon, and exist in a way which is unique in Wisconsin. Larger natural areas tend to be more self-sustaining and supportive of wildlife. The Lulu Lake SNA is highly functional in that regard and provides support for the Mukwonago River Unit which affords recreational opportunities for thousands of Wisconsin citizens each year. With careful management, the Lulu Lake SNA will continue to support that recreation, as well as provide an excellent example of natural Wisconsin for years to come.

Purpose of State Natural Areas

State Natural Areas are managed in accordance with Wis. Stat. s. 23.27 to assure sustainably managed natural areas that provide ecological, social, and educational benefits for present and future generations. The definition and Importance of natural areas are outlined in Wis. Stat. s. 27.27:

> (1)(e) "Natural area" means an area of land or water which has educational or scientific value or is important as a reservoir of the state's genetic or biologic diversity and includes any buffer area necessary to protect the area's natural values. Frequently, "natural areas" are important as a reserve for native biotic communities. Frequently, "natural areas" provide habitat for endangered, threatened or critical species or for species of special concern to scientists. In some cases, "natural areas" include areas with highly significant geological or archaeological features. Generally, "natural areas" are areas which largely escaped unnatural environmental disturbance or which exhibit little evidence of recent environmental disturbance so that recovery of natural conditions has occurred.
>
> (2) Importance. The department, with the advice of the council, shall maintain a system to evaluate the importance of natural areas. The system shall include standards for determining low, high and critical levels of importance for natural areas. This system shall consider the following natural values:
>
> > (a) The value of the area as a preserve or reservoir which exhibits an outstanding or high quality example of a native plant or animal community.
> >
> > (b) The value of the area as a preserve or reservoir for any endangered, threatened or critical species or for a species of special concern to scientists.
> >
> > (c) The value of the area as a preserve or reservoir of genetic or biological diversity.
> >
> > (d) The degree to which the area was subject to unnatural environmental disturbance and the degree of recovery.
> >
> > (e) The value of the area for educational or scientific research purposes and as a reference site for comparison with areas subjected to environmental disturbance.
> >
> > (f) The value of the area for educational or scientific research purposes because of important or unusual characteristics.
> >
> > (g) The significance or uniqueness of the area in the locality, region and state.
> >
> > (h) The existence of highly significant geological or archaeological features.
> >
> > (i) The value of the area for public educational purposes, including the value of the area in promoting public awareness, appreciation, understanding and respect for the state's natural heritage.

EXISTING ASSESSMENT REPORTS

Many sources were used for this analysis. Beginning in 1997 and updated in 2010, the Southeastern Wisconsin Regional Planning Commission report on Natural Areas and Critical Species Habitat Protection and Management Plan (SEWRPC 1997, SEWRPC 2010a) mapped the location and extent of natural areas and critical species habitats within southeast Wisconsin. The plan developed recommendations for the preservation and management of those natural areas, as well as critical species habitats found in Walworth and Waukesha counties, which taken together encompass the MRU in its entirety. The Mukwonago River Watershed Protection Plan provided information about the nature and quality of the Mukwonago watershed (SEWRPC 2010b). The Biotic Inventory and Analysis of the Kettle Moraine State Forest, and the Southern Kettle Moraine Region Rapid Ecological Assessment documents (WDNR 2010, WDNR 2011) were also used as references.

The Nature Conservancy's (TNC) Prairie-Forest Border Ecoregion Conservation Plan (TNC 2001) recognized the KMSF as a "Functional Landscape," which contains both coarse-scale aquatic and terrestrial targets along with their inclusive biodiversity. The surrounding KMSF region contains high concentrations of Calcareous Fens, remnant prairies, oak openings, and forest. In addition, the Southern Unit is noted as a priority landscape for grassland birds and prairie remnants.

The Wisconsin Wildlife Action Plan (WDNR 2006b) designated the KMSF to be of global significance due to the region's abundance of globally rare bur oak openings that represents the best opportunity for large scale restoration. The Important Bird Areas Program (IBA; WDNR 2007) assessed critical sites for the conservation and management of Wisconsin's birds. The KMSF Southern Unit was recognized for its importance to priority grassland and savanna birds, very high numbers of fall migratory birds, and provides core habitats for the Cerulean Warbler and the largest population of Hooded Warblers in the state. Also, the Natural Heritage Inventory of the Kettle Moraine State Forest (WDNR 2010) was used for more updated ecological inventories.

To assess recreational resources, the 2005-2010 and 2011-2016 Wisconsin Statewide Comprehensive Outdoor Recreation Reports were used, particularly the Lower Lake Michigan Coastal and Region 10 profiles (WDNR 2006, WDNR 2012).

*Analyses reflect the best available data at the time the RPA was written.

ANALYSIS OF THE REGION

LAND USE AND TRENDS

The MRU spans the southwestern corner of Waukesha County and the northeastern corner of Walworth County in southeast Wisconsin. The nearest communities are the City of Mukwonago four miles to the east and the village of East Troy three miles to the south. The closest major urban/metropolitan area is the City of Milwaukee, located in Milwaukee County, approximately 35 miles to the east. Lulu Lake SNA is adjacent to and directly west of the Mukwonago River Unit (MRU).

Land Use/Land Ownership

In Walworth County, the dominant land use is agricultural at 57.6%. In contrast, land use in Milwaukee County is dominated by residential and commercial property (43.3% and 26% respectively). Waukesha County falls in between with 21.2% agricultural use and 36.7% combined residential and commercial use. When looking at the southeast region as a whole, it has a slightly higher proportion of agricultural land and a considerably higher proportion of developed property than the rest of the state. Forests are an uncommon land cover in the region, comprising only 5.1% of Walworth County, 3.2% of Waukesha County, and 0.0% of Milwaukee County. Public conservation land is very low in the region compared to the state (4.3% vs. 17.1%), resulting in limited access to outdoor recreational activities for a large regional population of over two million. Since the early 2000s, there has been a decline in agricultural acreage due to urban conversion, and among the remaining agricultural land, there was a subdivision of parcels. This subdivision coupled with naturally high property values of the region limits further acquisition of public lands for recreational use.

Population Centers

The City of Milwaukee is the major population center in the region, and the greatest source of visitors to the Kettle Moraine State Forest Southern Unit. The population for the City of Milwaukee was 594,833 in 2010, which is greater than the total combined population of Waukesha and Walworth counties in 2010 (389,891 and 102,228 respectively). The City of Waukesha, the largest municipality in Waukesha County, had a population of 70,718 in 2010 and is the third greatest source (with Chicago being second) of visitors to the Kettle Moraine State Forest Southern Unit area. In Waukesha County, the City of Oconomowoc and the village of Mukwonago provide the fourth and fifth most visitors to the Kettle Moraine State Forest Southern Unit area and the highest percent of visitors per municipal population (5.8% and 7.4% respectively compared to 0.3% of Milwaukee and 1.4% of Kenosha) (See Map B).

Milwaukee, Waukesha, and Walworth counties all experienced natural population growth between 2000 and 2008; however, Milwaukee County had an overall 0.2% fall in population due to residents leaving the county. In contrast, such net migration rose in Waukesha and Walworth counties (6.1% and 10.1% respectively). Both Waukesha and Walworth counties are projected to continue in their growth as Milwaukee County continues in its decline.

Transportation Networks

Large urban populations within a 30 mile radius place heavy demand on regional recreational properties. The overall region is well supported by several major highways, airports, and train stations. Interstate 43 runs southwest of the Mukwonago River Unit and proceeds northeast to the Milwaukee metropolitan area after passing through Waukesha and Walworth counties. Its closest point measured along the road network is approximately 5 miles from entrances to the MRU and Lulu Lake, which are located on County Highway E one mile north of County Road J. U.S. Highway 12 is approximately 10 miles west, and Interstate Highway 94 is approximately 20 miles north of these properties. The MRU is also accessible from the north by County Road LO, and County Road J from the south of property. Lulu Lake can also be accessed from the south by County Highway J as well as other local roads.

Employment

Manufacturing is the top industry in the region, although it has seen a major decline of 21.3% between 2008 and 2010. In contrast, heath care and social assistance, the second largest regional industry, has seen a growth of 17.2% during the same period. Recreation-related industry is especially important to Walworth County as it accounts for 16.3% of employment.

RECREATIONAL RESOURCES, USE, AND DEMAND

Wisconsinites are active participants in most forms of outdoor recreation, and recreation participation rates within Wisconsin are higher than most other regions of the country. This high level of participation may be attributed to the combination of Wisconsin's abundant recreation resources as well as the state's four season climate, which provides recreational opportunities year-round.

The following sections describe the recreation demand in the region, supply of opportunities, and trends and issues for future use. Analysis of the MRU regional recreation is drawn from the 2011-2016 & 2005-2010 volumes of the Wisconsin Statewide Comprehensive Outdoor Recreation Plan (SCORP) and other sources. SCORP classifies and measures the preferences and needs of a statewide recreating public and is an invaluable tool in understanding the supply and demand of regional recreation. SCORP is updated every five years, informing and shaping recreational planning on state properties. SCORP divides the state into eight planning regions based on a collection of natural resources and tourism assets. The MRU is in the Lower Lake Michigan Coastal Region of the SCORP (Kenosha, Milwaukee, Ozaukee, Racine, Sheboygan, Walworth, Washington, and Waukesha counties). This is the most highly urbanized region in the state.

The MRU and Lulu Lake SNA have different purposes. The MRU is intended to see a significant number of visitors each year and will offer a variety of recreational uses to the public. Historically, Lulu Lake has discouraged intensive public use by specifically permitting recreational activities which do not degrade the natural features such as hiking, nature appreciation and educational uses. However, the recreational opportunities at MRU will undoubtedly have an effect on Lulu Lake due to the greater degree of visitation it will experience as part of a combined natural resource.

Regional Demand

The 2011 SCORP notes that 87% of Wisconsin residents enjoy some form of outdoor recreation. The Kettle Moraine State Forest Southern Unit is a major draw for citizens from the nearby communities of Mukwonago, Waukesha and Oconomowoc. The KMSF is also popular with park users from Milwaukee, as well as visitors who travel the nearly 100 mile distance from the Chicago Metropolitan area. The 2005 SCORP indicates that there is considerable influence of urban recreational preferences in the Lower Lake Michigan Coastal area. These preferences include access to outdoor facilities such as dog parks, city trails and basketball courts. However, there is less demand for most of these municipally oriented activities in the natural setting.

The MRU and Lulu Lake SNA provide quality opportunities for outdoor recreation, which stands in contrast to those available near urban areas. The Lower Lake Michigan Coastal Region possesses the highest concentration of population in Wisconsin. Park usage will be dependent upon the recreational opportunities available to this broad user base. Within the region, people desiring to participate in outdoor recreation activities ranges from 5.6% for Snowshoeing to 85.7% for Walking. Even the lower percentage activities may yield significant numbers of visitors considering the regional population (estimated by the U.S. Census to be 2,143,335 in 2011). In 2004, the Wisconsin Department of Tourism conducted a survey of both the Chicago and Minneapolis Designated Market Areas (DMAs). From the recreational activities listed above, picnicking, fishing and hiking ranked in the top 5 for these visitors to the Lower Lake Michigan Coastal region.

Wisconsin also has high participation rate hunting and wildlife watching when compared to the rest of the nation. Wisconsin is second highest in the nation with the number of in-state hunters, second only to Texas. Further, 48% of state residents participate in wildlife watching activities, the third highest in the nation.

While those numbers are significant, the trend of participating sportsmen and women faces headwinds. According to the U.S. Sportsmen's Alliance, Wisconsin has only five new hunters joining the sport for every ten that leave. Because of this issue, the Legislature created a Sporting Heritage Council in 2012. The mission of the twelve-member Council is to provide advice to the Governor, the Natural Resources Board, and the Legislature on fishing, hunting, and trapping issues.

Regional Supply

Publicly owned lands are important components of Wisconsin's recreational opportunities. The three primary public providers of recreation lands include: the federal government, state government, and local units of government (counties, cities, villages, and towns). The 2005 SCORP shows that state parks and wildlife areas are well distributed throughout the state, providing good public access. However, public lands tend to be concentrated in the northern and west central areas of the state. The Lower Lake Michigan Coastal region, in comparison, has relatively few acres of public land for outdoor activities. The Mukwonago River Unit will provide an additional 968 acres of state recreational area to the adjacent Lulu Lake's 1,848 acres of natural area, a significant portion of which is owned and managed by the Nature Conservancy.

Public Lands and Recreation Supplies near the Mukwonago River Unit and Lulu Lake

The Mukwonago River Unit and Lulu Lake lie in an ecological landscape known as the Southeast Glacial Plains. Major public lands therein include the Horicon National Wildlife Refuge/ Horicon State Wildlife Area to the north, as well as the Northern, Southern Lapham Peak, Loew Lake and Pike Lake units of the Kettle Moraine State Forest. The "Kettle Moraine" is an area of rough topography on the eastern side of the Southeast Glacial Plains that marks the areas of contact between the Green Bay and Lake Michigan glacial lobes. Numerous excellent examples of glacial features occur and are highly visible in the Kettle Moraine. Other state lands here are managed for fish, wildlife, natural areas, and recreation. Cedarburg Bog, an extensive wetland complex in southeastern Wisconsin, is owned by the University of Wisconsin system and the Wisconsin DNR. County-owned lands are not extensive but include significant features, including several ecologically important stretches of the Niagara Escarpment.

There are publicly-owned lands adjacent to and in the vicinity of both MRU and Lulu Lake (See Map C). Notable public lands which contribute to the region's mix of recreation activities include:

Kettle Moraine State Forest Southern Unit

More than 22,000 acres of glacial hills, kettles, lakes, prairie restoration sites, pine woods and hardwood forests can be found in the Southern Unit, making this a popular area for a wide variety of visitors. The Forest is 30 miles long, extending from the village of Dousman almost to the City of Whitewater. The forest headquarters is 3 miles west of the village of Eagle on State Highway 59. The hills and valleys of the KMSF Southern Unit (KMSFSU) have a great variety of natural habitats, plants, and animals, including species such as red foxes, sandhill cranes, and Cooper's hawks. While the Mukwonago River Unit is not contiguous with the KMSF, it will be considered part of that designation. There are nine existing state natural areas in the forest including:

- Bluff Creek
- Clifford F. Messinger Dry Prairie and Savanna Preserve (sixteen separate units)
- Clover Valley Fen
- Eagle Oak Opening
- Kettle Moraine Low Prairie
- Kettle Moraine Oak Opening
- Ottawa Lake Fen
- Scuppernong Prairie
- Young Prairie

The Southern Unit of the Kettle Moraine State Forest has more than 160 miles of trails, varying in difficulty, length, and permitted uses. Steep climbs or descents are common. Parking lots are provided throughout the forest. There are 87 miles of equestrian trails of varying lengths over this cross section of the Kettle Moraine. The Moraine Ridge Trail (main trail through the forest), and the loop and access trails allow for snowmobiling in winter. The KMSFSU provides a wide range of other activities including bicycling, swimming, fishing, boating, canoeing, kayaking, cross-country skiing and snow shoeing. There are over 330 campsites available in the KMSFSU.

Vernon Wildlife Area

The Vernon Wildlife Area is a 4,655 acre property (4,154 acres owned and 501 acres leased) located just north of Mukwonago in eastern Waukesha County. The property consists of mostly wetlands/flowages with the Fox River snaking through. Adjoining uplands consist of grasslands and some woodlots. A calcareous fen is also present on the south side. It offers excellent wildlife habitat, especially for migrating and nesting waterfowl.

Land in the wildlife area was first leased in 1946 as a public hunting ground. Purchase of the property by the DNR began four years later, assisted by donations from Wetlands for Wildlife and other conservation organizations. It is a popular area for waterfowl, pheasant, small game, turkey and deer hunting. Handicapped blinds for waterfowl hunting are available off Frog Alley Road. Other activities at the Vernon Wildlife Area include:

- Birding
- Boating (no gasoline powered motors except on Fox River)
- Canoeing
- Cross country skiing (no designated trail)
- Dog trial grounds (training permits required)
- Fishing
- Hiking (no designated trail)
- Snowmobiling trail
- Trapping
- Wild edibles/gathering
- Wildlife viewing

These activities provide a good compliment to those offered by the Mukwonago River Unit and the Lulu Lake SNA. MRU will provide excellent group camping opportunities not available at the Vernon Wildlife Area. Lulu Lake through its emphasis on preserving the natural landscape will ensure continued enjoyment of natural settings for future generations.

Beulah Bog SNA

Beulah Bog lies in a series of four kettle holes and features an undisturbed bog with many unusual plants more typical of northern bogs. The bog lake provides habitat for several dragonfly species and other invertebrates. Beulah Bog is owned by the DNR and was designated a State Natural Area in 1975.

Activities allowed at Beulah Bog include:

- Hiking
- Fishing
- Cross country skiing
- Hunting
- Trapping
- Pets
- Scientific research (permit required)

- Outdoor education
- Collection of wild edibles
- Wildlife-viewing

Beulah Bluff Preserve

The Beulah Bluff Preserve owned by the Kettle Moraine Land Trust is an 8 acre hilltop prairie and oak woodland partially purchased with funding from the Knowles-Nelson Stewardship fund. The Preserve will be fully opened to the public in 2014 and is located within a mile of MRU. The site is significant for its groundwater recharge potential, scenic views of Lake Beulah and passive recreation opportunities.

Mukwonago Park – Waukesha County Park

Mukwonago Park is a 355 acre recreational area accessible from County Highway LO three miles west of the Village of Mukwonago. Mukwonago Park features include a high ridge formed during the glacial period. Vegetation includes Burr Oak, Shagbark Hickory and prairie plants. Red-tailed Hawk and Turkey Vulture are common in the park.

Recreational activities include: swimming, fishing, picnicking, hiking, camping (36 sites), archery, cross-country skiing, snowshoeing and sledding. Mukwonago Park provides a recreation center and four picnic shelters all of which are electrified and reservable through the park's webpage depending on time of year. Swimmers will find a 1.2 acre spring fed swim pond with sand beach and a beach house.

REGIONAL RECREATIONAL ISSUES, NEEDS AND TRENDS

Understanding the supply and demand of recreational resources is an important component of planning for recreational opportunities. If there is a demonstrated shortage of a particular resource, it is important to know what the future demand for that resource will be. The Wisconsin DNR conducted a series of town meetings across the state in 2005. These meetings collected over 1,400 responses about citizen's perceptions of recreation issues and barriers to recreation. The 2005 SCORP details recreational issues mentioned by respondents from the Lower Lake Michigan Coastal Region:

- Increasing multiple-use recreation conflicts
- Loss of public access to lands and waters
- Overcrowding
- Preservation of natural lands
- Relevance for urban population

These results show the need for natural areas in the region which allow diverse recreational activities and provide a degree of separation between uses.

Another way to understand this demand is by gauging user perceptions of a particular recreation amenity. The 2005 SCORP also assessed visitor perceptions of their top recreation needs. For the Lower Lake Michigan Coastal Region, these needs include:

- More biking trails
- More camping opportunities
- More dog parks
- More hiking and horse trails
- More public lands
- More silent sport opportunities

REGIONAL ECOLOGICAL SETTING

According to the National Hierarchical Framework of Ecological Units classification of Land Type Associations (LTA), the landform in this region (East Troy Lakes LTA) is defined as rolling pitted outwash plain with many lakes. Soils are predominantly well-drained loam over calcareous gravelly sandy outwash. This area has some of the largest and highest quality wet-mesic prairies and calcareous fens in the state. Spring ponds, spring runs, and headwater streams provide important habitat diversity.

The Mukwonago-Fox River Watershed Initiative in Kenosha, Milwaukee, Racine, Walworth, and Waukesha Counties is a 4,153 acre wetland protection and enhancement project. This project will protect and enhance critical wetland and riparian habitat and adjacent uplands within these watersheds to ensure their long-term conservation.

The Mukwonago Watershed

The Mukwonago Watershed is composed of the Mukwonago River and its major tributaries, as well as seven major lakes (Lulu Lake, Eagle Spring Lake, Lake Beulah, Upper Phantom Lake, Lower Phantom Lake, Army Lake, and Booth Lake) and seven minor lakes. The Mukwonago River Watershed Protection Plan notes that "the system is sustained by groundwater recharge, seepage from wetlands and moraines, and precipitation runoff from about a 74-square-mile watershed" (SEWRPC, 2010b). Within the project boundary, the Mukwonago River system includes Lulu Lake, which is designated an Outstanding Resource Water under Chapter NR 102 of the Wisconsin Administrative Code. The Mukwonago River has been designated by the DNR as a Class I brown trout fishery upstream from Lulu Lake and between Lulu Lake and Eagle Spring Lake. Downstream of Eagle Spring Lake, the river is designated as a Class II trout stream. Since 1988, brook trout have been have been stocked nearly annually into the Mukwonago River, but do not show significant signs of breeding, perhaps due to water temperatures which are often above optimal. SEWRPC describes the area around the lakes adjacent to or within the project boundaries (Eagle Spring Lake, Hogan Lake, Lulu Lake, Rainbow Springs Lake) as one of the primary environmental corridors which "represent a composite of the best remaining elements of the natural resource base, and contain almost all of the best remaining woodlands, wetlands, and wildlife habitat areas in the watershed."

Wisconsin has designated many of the state's highest quality waters as Outstanding Resource Waters (ORWs) or Exceptional Resource Waters (ERWs). Waters designated as ORW or ERW are surface waters which provide outstanding recreational opportunities, support valuable fisheries and wildlife habitat, have good water quality, and are not significantly impacted by human activities. ORWs and ERWs share many of the same environmental and ecological characteristics. They differ in the types of discharges each receives, and the level of protection established for the waterway after it is designated. ORWs typically do not have any point sources discharging pollutants directly to the water (for instance, no industrial sources or municipal sewage treatment plants), though they may receive runoff from nonpoint sources. If a waterbody has existing point sources at the time of designation, it is more likely to be designated as an ERW.

TABLE 1. WATER RESOURCES WITHIN MRU AND LULU LAKE SNA

Water Resource Name	Planning Area	Acreage	Maximum Depth (feet)	Water Quality[1]
Eagle Spring Lake	Lulu Lake SNA	279	8	
Hogan Lake	Adjacent to MRU	8	3	
Lulu Lake	Lulu Lake SNA	95	40	ORW
Mukwonago River	Lulu Lake SNA, MRU			ERW, Class I & II trout stream
Rainbow Springs Lake	MRU	35	16	

[1]ERW – Exceptional Resource Waters

ORW – Outstanding Resource Waters

Trout Stream Classification:

Class I: High quality trout waters that have sufficient natural reproduction to sustain populations of wild trout, at or near carry capacity.
Class II: Streams in this classification may have some natural reproduction, but not enough to utilize available food and space.
Class III: These waters are marginal trout habitat with no natural reproduction occurring.

While the overall quality of the waters within the Mukwonago River System watershed is high, the potential for groundwater contamination is considered to be moderate to very high. This is due to a number of factors including the distance from surface to shallow aquifer, the presence of areas with high permeability and an estimation of annual soil percolation rate (SEWRPC, 2002).

ANALYSIS OF THE PROPERTY: MUKWONAGO RIVER UNIT

PHYSICAL ENVIRONMENT

The topography of the MRU is relatively level, with slight rolling hills toward the north central end of the property. Surface water includes Rainbow Springs Lake; the Mukwonago River flows west to east, through the north end of the MRU. Past development includes a 36-hole golf course, remnants of a never-completed resort complex, and a network of roads. About one-third of the property is covered by hydric soils, especially in the northeast and south-central.

MUKWONAGO RIVER UNIT LAKES

Rainbow Springs Lake, which is approximately 35 acres in surface area, is situated entirely within the MRU in Waukesha County. Rainbow Springs Lake is a natural seepage lake with a maximum depth of 16 feet that feeds into the Mukwonago River. A large natural seepage lake such as Rainbow Springs Lake is a rare commodity in this urbanized portion of Wisconsin.

Hogan Lake is a small, shallow seepage lake located in glacial deposits partially within the MRU boundary and partially on Waukesha County parkland. The lake has an outlet tributary to the Mukwonago River. This small lake is eight acres in area with a maximum depth of 3 feet. The fish population is limited to pan fish and minnows because of winterkill conditions and the lack of suitable habitat. This is a marl basin, which is somewhat unusual for its location.

VEGETATION AND NATURAL COMMUNITIES

Historic Vegetation

The pre-settlement vegetation of the landscape around the MRU was a mosaic of oak forest, oak openings, prairie, open wetlands, and a limited amount of brush. Mesic forest of sugar maple and basswood occurred to the east, and small lakes dotted the area. The oak forests and openings were dominated by white, black, northern red and bur oaks. Within the boundaries of the MRU, pre-settlement vegetation was about two-thirds oak-dominated uplands and one-third open wetlands, including surface waters. However, much of the historic oak opening and oak woodland around this area have succeeded to dense hardwood forests due to fire suppression.

Current Vegetation and Natural Communities

Most of the property is a modified landscape that has been altered by the previous landowner. Oaks continue to be an important tree species in this area. The current land is mostly covered in grasslands, woodlands, wetlands, and a lake (See Map D). Plantations, of white and red pine, are scattered throughout the property; pine was not part of the pre-settlement landscape here. Much of the property is a retired golf course consisting of cool season grasses and drained wetlands.

Good quality shrub-carr has been identified on MRU, and has likely expanded since the removal or fire from the landscape. This wetland is dominated by tall shrubs such as red-osier dogwood, silky dogwood, meadowsweet, and various willows. Canada bluejoint grass is often very common. This type occupies areas that are transitional between open wetlands such as wet prairie, calcareous fen, or southern sedge meadow and forested wetlands such as floodplain forest or southern hardwood swamp. Shrub-carr can persist at a given site for a very long time if natural hydrologic cycles are maintained. This type often occurs in bands around lakes or ponds, on the margins of river floodplains, or, more extensively, in glacial lakebeds. It is common and widespread in southern Wisconsin but also occurs in the north. In the south, shrub-carr was often an integral part of prairie-savanna landscapes, though it also occurred in wetlands within more forested regions. Statewide, shrub-carr remains quite common, and has fared considerably better than many of the other native wetland types within its range.

TABLE 2. NATURAL COMMUNITY TYPES IN MRU

Common Name	Scientific Name	Last Observed
Shrub-carr	*Shrub-carr*	1976

TABLE 3. LAND COVER TYPES AT MRU

Covertype	Acres	% Cover
Oak	237.61	24.46
Grassland	234.57	24.15
Upland Conifer	130.27	13.41
Shrub	122.95	12.66
Open Wetland	72.54	7.47
Water	65.44	6.74
Central Hardwood	33.92	3.49
Aspen	29.25	3.01
Emergent Vegetation	25.24	2.60
Upland Hardwood	19.53	2.01
Total	**971.32**	**100.00**

WILDLIFE RESOURCES

The Mukwonago River is classified as an exceptional water resource and a Class II trout stream. Including its lakes and tributaries, the river supports 58 species of fish. It is one of the most biologically rich mussel habitats in the State of Wisconsin, supporting 16 species and the only viable population of the state endangered Rainbow Shell Mussel. However, this rare species has not been documented at MRU. Mukwonago River provides suitable habitat for panfish, largemouth bass, and northern pike.

The property provides habitat for a variety of both upland and wetland wildlife. The emergent wetlands provide habitat for wetland associated birds including waterfowl, cranes, herons, and others. The rolling oak woodlands provide habitat for oak associated wildlife including turkeys, woodpeckers, deer, and squirrels. The fallow grasslands provide habitat for species such as bobolinks, meadowlarks, and ground squirrels. Although their wetland habitats continue to be threatened by agricultural activities and development, much of the nesting habitats of wetland-associated bird species are provided by these rolling glaciated landscapes.

Habitat Needs and Capabilities

Primary habitat restoration of the MRU should focus on the retired golf course. This site has a high potential as native grassland and wetland habitat, but is currently in a degraded condition of monotypic cool season grass and drained wetlands. Restoration and protection of these lands will directly benefit both wetland and grassland bird species. The property includes breeding habitat for several waterfowl species such as mallards, blue-winged teal, wood ducks, sandhill cranes and Canada geese. It also includes foraging, nesting, and migratory stop-over habitat for several species of shorebirds, waterfowl, and water birds such as Wilson's phalarope, greater yellowlegs, northern pintail, lesser scaup, American bittern, black tern; and marsh wren. Additionally the area could provide nesting habitat for grassland bird species of concern such as sedge wren, dickcissel, eastern meadowlark, and grasshopper sparrow.

ENDANGERED, THREATENED AND SPECIAL CONCERN SPECIES

Rare species are tracked in Wisconsin's Natural Heritage Inventory (NHI) database. There is one rare plant documented at MRU: kitten tails (state threatened) which was last observed in 2009. There are 16 state listed threatened or special concern animal species (15 birds, 1 fish) located on the MRU. In addition, there is one state special concern animal assemblage (bird rookery) located on the property. No state endangered species have been

observed at MRU. There are two threatened birds (cerulean warbler and hooded warbler). The remaining listed species are special concern.

TABLE 4. ENDANGERED, THREATENED OR SPECIAL CONCERN PLANT AND ANIMAL SPECIES IN MRU

Common Name	Scientific Name	Last Observed	State Status
Plant			
Kitten Tails	*Besseya bullii*	2009	THR
Bird			
Black-billed Cuckoo	*Coccyzus erythropthalmus*	2010	SC
Blue-winged Warbler	*Vermivora pinus*	2010	SC
Bobolink	*Dolichonyx oryzivorus*	2010	SC
Cerulean Warbler	*Dendroica cerulea*	2010	THR
Eastern Meadowlark	*Sturnella magna*	2010	SC
Field Sparrow	*Spizella pusilla*	2010	SC
Hooded Warbler	*Wilsonia citrina*	2010	THR
Northern Harrier	*Circus cyaneus*	2010	SC
Osprey	*Pandion haliaetus*	2010	SC
Veery	*Catharus fuscescens*	2010	SC
Whip-poor-will	*Caprimulgus vociferus*	2010	SC
Willow Flycatcher	*Empidonax traillii*	2010	SC
Wood Thrush	*Hylocichla mustelina*	2010	SC
Yellow-billed Cuckoo	*Coccyzus americanus*	2010	SC
Fish			
Lake Chubsucker	*Erimyzon sucetta*	2008	SC
Animal Assemblage			
Bird Rookery	*Bird Rookery*	2010	SC

EXISTING RECREATIONAL FACILITIES AND USE

The property was initially developed in the late 1960s as a golf course/resort facility. An incomplete lodge and hotel/conference center was significantly damaged by fire in 2003 with the majority of the hotel being demolished a few years later. A pro-shop with clubhouse and a 36-hole golf course was active until October of 2010. Currently, only a clubhouse and a small housekeeping cabin remain. There is a 15-foot snowmobile trail which transitions from the Lulu Lake SNA into the MRU at a point approximately 1/2 mile below the MRU's County Highway E entrance. The trail continues north until it meets the entrance road from County Highway E, and then continues east briefly before moving north past the western edge of Rainbow Springs Lake and out of the MRU. The MRU side of the snowmobile trail is run by the Mukwonago Sno-Scoops. There is an agreement with the DNR in place for the period of December 2012 through March 2013[1]. Nature-based outdoor recreation activities allowed on the property include: hunting, trapping fishing, hiking, berry-picking, snowmobiling and cross-country skiing.

EXISTING SPECIAL DESIGNATIONS

NAWCA Easement: In September 2010, the North American Wetlands Conservation Council approved a $1 Million North American Wetlands Conservation Act (NAWCA) grant to Ducks Unlimited (DU) for habitat conservation in the Mukwonago and Fox River Watersheds of Wisconsin. The grant provides matching funds to organizations and

[1] Land Use Agreement dated October 23rd of 2012 lists end of agreement period as March of 2012.

individuals who have developed partnerships to carry out wetlands conservation projects in the United States, Canada, and Mexico for the benefit of wetlands-associated migratory birds and other wildlife.

As part of this match, the Department will use state stewardship lands within the MRU. These 239 acres of "match" lands are shown on Map C. The value of these match lands has been appraised at $1,080,000 which will be used to meet NAWCA grant obligations. The "match" lands are deed restricted with a conservation easement to support the values of NAWCA.

CULTURAL/ARCHEOLOGICAL RESOURCES

There are no known cultural sites at the Mukwonago River Unit property.

ADMINISTRATIVE AND OTHER NON-PUBLIC USE FACILITIES AND STRUCTURES

Currently, only the former clubhouse and a three room cabin are located on the property.

ANALYSIS OF THE PROPERTY: LULU LAKE

PHYSICAL ENVIRONMENT

The western two-thirds of the Lulu Lake property is a series of narrow ridges/isthmuses, large wetlands, and smaller unnamed lakes. The eastern third of the property is more level with much of it formerly in row crops. The property borders the southern end of Eagle Spring Lake. The topography of the property is relatively level, with slight rolling hills on the southeast and southwest ends of the property. The USDA NRCS also categorized over one third of the land as USGS hydric soils, mostly on the northern and west central portion of the property.

LAND OWNERSHIP

There are two primary landowners within the Lulu Lake SNA project boundary: WI DNR and The Nature Conservancy (TNC). Each of these owners conducts land management activities on the properties they own, and often cooperate and share resources. DNR managed lands equals approximately 1,215 acres. TNC owns 635 acres of land which is designated State Natural Area by legal Articles of Dedication (See Map C). There are numerous private homes, as well as privately owned land, within the boundary.

LULU LAKE SNA LAKES

The 95-acre Lulu Lake is a 40-foot deep, hardwater drainage kettle lake fed by the Mukwonago River and situated at the base of glacial deposits. Lulu Lake is located immediately upstream of Eagle Spring Lake and is accessible from Eagle Spring Lake by a navigable channel.

Eagle Spring Lake is a 279 acre drainage lake with a maximum depth of eight feet. Visitors have access to the lake from a public boat landing. Fish include panfish, largemouth bass and northern pike. The Mukwonago River provides the major inflow into Eagle Spring Lake, entering the Lake from the south where it discharges from Lulu Lake. The Eagle Spring Lake outflow is controlled by two outlet structures: a dam with a manually operated control gate (Wambold dam) and a former mill race (locally known as the Kroll dam) both located at the east side of Eagle Spring Lake just west of County Highway E.

VEGETATION AND NATURAL COMMUNITIES

Historic Vegetation

Historically, the Lulu Lake State Natural Area was covered by open wetlands and lowland shrubs, along with oak-dominated uplands, from forests to oak openings.

Current Vegetation and Natural Communities

The current vegetation on the site includes open, shrubby and forested wetland with flood plains and lowland corridors; as well as a mixture of land covertype of deciduous, coniferous, grass and shrubs (See Map D). Lulu Lake SNA supports numerous high-quality natural communities including globally significant Oak Openings. Wetland complexes are also of exceptional quality and include Calcareous Fen, Southern Sedge Meadow, Shrub-carr and Bog Relict. This area is also tremendously rich floristically and supports 25 rare plant species.

Southern Dry Forest is dominated by red, white, and bur oaks with a moderate shrub layer and a moderately dense herbaceous ground layer of both forest and savanna species. Conifer plantations are also present on the property. Oak Openings are dominated by bur oak and contain a dense herbaceous ground layer dominated by savanna species such as shooting-star (*Dodecatheon meadii*), Carolina vetch (*Vicia caroliniana*), sunflowers (*Helianthus* spp.), and tick-trefoils (*Desmodium* spp.). The oak-dominated uplands grade into high-quality open-canopied wetland complexes with patches of Calcareous Fen and Shrub-carr embedded within a Southern Sedge Meadow matrix surrounding the Mukwonago River and the 95-acre, 40-foot deep Lulu Lake. Calcareous Fen is limited to small areas of groundwater upwelling and is dominated by sedges including fen star sedge (*Carex sterilis*), common stiff sedge (*C. tetanica*), tussock sedge (*C. stricta*), and Buxbaum's sedge (*C. buxbaumii*),

The wetland surrounding Lulu Lake is partly comprised of Shrub-carr which is dominated by shrubby cinquefoil (*Potentilla fruticosa*), Bebb's willow (*Salix bebbiana*), pussy willow (*S. candida*), bog birch (*Betula pumila*) and poison sumac (*Toxicodendron vernix*) with a tussock sedge ground layer. The associated Southern Sedge Meadow is dominated by tussock sedge, water sedge, prairie sedge (*C. prairea*) and bluejoint grass (*Calamagrostis canadensis*). An inlet stream contains many rare species such as beaked spike-rush (*Eleocharis rostellata*), slender bog arrow grass (*Triglochin maritimum*), and downy willow herb (*Epilobium strictum*).

There is a small, but significant, Bog Relict surrounding a small kettle lake east of Lulu Lake The bog is dominated by leatherleaf (*Chamaedaphne calyculata*), poison sumac, Bebb's willow, bog birch, blueberry (*Vaccinium* spp.), bog rosemary (*Andromeda glaucophylla*), woolly-fruit sedge and *Sphagnum* moss. Tamarack is also locally dominant. As with other wetland communities, the Bog Relict is surrounded by moderate to high-quality oak woodlands as well as old fields, prairie remnants, and prairie plantings. Lulu Lake SNA presents the greatest opportunity in the Southern Kettle Moraine Region for managing a mosaic of Dry Prairie, Oak Opening and Oak Woodland.

TABLE 5. NATURAL COMMUNITY TYPES IN LULU LAKE

Common Name	Scientific Name	Last Observed
Oak Opening	*Oak opening*	1993
Shrub-carr	*Shrub-carr*	1976
Southern Sedge Meadow	*Southern sedge meadow*	1988
Southern Dry Forest	*Southern dry forest*	1992
Bog Relict	*Bog relict*	1987
Calcareous Fen	*Calcareous fen*	2010
Emergent Marsh	*Emergent marsh*	1993
Lake--Deep, Hard, Drainage	*Lake--deep, hard, drainage*	1988
Springs and Spring Runs, Hard	*Springs and spring runs, hard*	1977

TABLE 6. LAND COVER TYPES AT LULU LAKE SNA

Cover Type	Acres	% Cover
Emergent Vegetation	558.47	22.14
Upland Hardwood	408.30	16.18
Agriculture	364.26	14.44
Oak	339.67	13.46
Central Hardwood	237.20	9.40
Grassland	198.23	7.86
Water	139.22	5.52
Open Wetland	123.89	4.91
Upland Conifer	90.11	3.57
Developed	38.65	1.53
Aspen	14.15	0.56
Shrub	7.66	0.30
Swamp Conifer	3.20	0.13
Total	**2523.01**	**100.00**

WILDLIFE RESOURCES

Although water clarity of Lulu Lake is slightly turbid, it provides suitable habitat for panfish, largemouth bass, and northern pike. Four species of Shiners have been known to occur. Amphibians and reptiles including Blanding's turtle, as well as pickerel and bull frogs are present. Lulu Lake SNA also provides a significant amount of oak opening habitat. Oak openings are important for species such as the red-headed woodpecker and brown thrasher. The oak openings, oak woodlots, emergent wetlands, cool season grasslands, and restored prairies of Lulu Lake SNA provide exceptional habitat for a diverse wildlife community. Deer, red and gray squirrels, raccoons, rabbits and coyotes are common mammals. Several small mammals such as mice, voles and shrews are found in the area, as well as striped skunk, opossum, chipmunk, ground squirrels, stone marten and woodchuck. Bird life includes wetland, grassland, and oak associated species. Common birds include turkeys, sandhill cranes, waterfowl, woodpeckers, warblers, and an array of other songbirds. Birds of prey including red tailed hawks, Cooper's hawks, and great horned owls are present in the upland hardwoods. Game birds include ring-necked pheasant and American woodcock. Furbearers including mink, muskrats, beaver and raccoon are residents of the Lulu Lake wetlands. Several species of salamanders, turtles and snakes have been observed in the area. The high quality wetlands of the property provide habitat for a variety of reptiles and amphibians, including chorus, grey, and eastern treefrogs, spring peepers, green frogs, and painted and Blanding's turtles.

Habitat Needs and Capabilities

Restoration and protection of these lands will directly benefit both wetland and grassland bird species. The property provides habitat for wetland associated birds including ducks of all species common to southeastern Wisconsin. Sandhill cranes are present in the summer and fall. The property also includes breeding habitat for several waterfowl species such as blue-winged teal, wood duck, and Canada goose. Lulu Lake habitats provide foraging, nesting, and migratory stop-over habitat for several species of birds such as common yellowthroat, red-winged blackbird, black tern, cerulean warbler and marsh wren. Additionally the area could provide nesting habitat for grassland bird species of concern such as sedge wren, dickcissel, eastern meadowlark, and grasshopper sparrow. Primary habitat restoration needs are to remove invasive woody brush from the oak woodlands and conduct periodic prescribed burning to maintain the grasslands and oak communities. Restoration and protection of these lands will directly benefit wetland, grassland, and forest wildlife species.

ENDANGERED, THREATENED AND SPECIAL CONCERN SPECIES

Rare species are tracked in the Wisconsin NHI database. There have been twenty-one rare plants documented at the Lulu Lake SNA. One state endangered species (END) was last observed in 2009: purple milkweed. There are eight species listed as state threatened (THR), and twelve species listed as special concern (SC). Lulu Lake SNA supports at least thirteen rare animals including three rare birds, a rare mammal, a rare reptile, and several rare fishes and rare invertebrates. There is one state endangered butterfly (swamp metalmark); however, it has not been observed at the site since 1973. Four state threatened species have been observed at Lulu Lake SNA, including two birds, one turtle, and one fish. The remaining eight species are listed as special concern.

TABLE 7. ENDANGERED, THREATENED OR SPECIAL CONCERN PLANT SPECIES IN LULU LAKE

Common Name	Scientific Name	Last Observed	State Status
Autumn Coral-root	*Corallorhiza odontorhiza*	2001	SC
Beaked Spikerush	*Eleocharis rostellata*	2010	THR
Capitate spike-rush	*Eleocharis flavescens* var. *olivacea*	1934	SC
Downy Willow-herb	*Epilobium strictum*	1993	SC
Dwarf Milkweed	*Asclepias ovalifolia*	2010	THR
Few-flowered Spikerush	*Eleocharis quinqueflora*	2006	SC
Forked Aster	*Aster furcatus*	2010	THR
Kitten Tails	*Besseya bullii*	2010	THR
Low Nutrush	*Scleria verticillata*	1995	SC

Marsh Blazing Star	*Liatris spicata*	1992	SC
Northern Yellow Lady's-slipper	*Cypripedium parviflorum* var. *makasin*	2010	SC
One-flowered broomrape	*Orobanche uniflora*	2012	SC
Pale Green Orchid	*Platanthera flava* var. *herbiola*	2008	THR
Purple Milkweed	*Asclepias purpurascens*	2009	END
Slender Bog Arrow-grass	*Triglochin palustris*	2010	SC
Small White Lady's-slipper	*Cypripedium candidum*	2010	THR
Sticky False-asphodel	*Tofieldia glutinosa*	2010	THR
Swamp Agrimony	*Agrimonia parviflora*	2010	SC
Swan Sedge	*Carex swanii*	2010	SC
Tufted Bulrush	*Scirpus cespitosus*	2010	THR
White Camas	*Zigadenus elegans var. glaucus*	2010	SC

TABLE 8. ENDANGERED, THREATENED OR SPECIAL CONCERN ANIMAL SPECIES IN LULU LAKE

Common Name	**Scientific Name**	**Last Observed**	**State Status**
Bird			
Acadian Flycatcher	*Empidonax virescens*	2009	THR
Black Tern	*Chlidonias niger*	2009	SC
Cerulean Warbler	*Dendroica cerulea*	2010	THR
Mammal			
Pygmy Shrew	*Sorex hori*	2010	SC
Turtle			
Blanding's Turtle	*Emydoidea blandingii*	2010	THR
Fish			
Banded Killifish	*Fundulus diaphanus*	1978	SC
Lake Chubsucker	*Erimyzon sucetta*	1978	SC
Pugnose Shiner	*Notropis anogenus*	1978	THR
Butterfly			
Broad-winged Skipper	*Poanes viator*	1993	SC
Mulberry Wing	*Poanes massasoit*	2010	SC
Swamp Metalmark	*Calephelis muticum*	1973	END
Dragonfly			
Lilypad Forktail	*Ischnura kellicotti*	1990	SC
Elfin Skimmer	*Nannothemis bella*	2006	SC

EXISTING RECREATIONAL FACILITIES AND USE

DNR-managed Property: Lulu Lake does not have any public bathroom building or other constructed facilities. There are no DNR developed trails and no developed direct water access to Lulu Lake. There is a 15' wide snowmobile trail in the eastern DNR parcel of Lulu which runs from the edge of private land just below Eagle Springs Lake down toward Pickerel Jay Road. A side trail splits off to the east near the middle of the north-south trail which connects with

County Highway E approximately 1/2 mile south of an entrance to Lulu Lake. The trail continues into the MRU property. There is a signed agreement with the DNR that permits the Lake Beulah Drift Skippers to use the Lulu Lake side of the snowmobile trail. There is a separate signed agreement that permits the Mukwonago Sno-Snoops to use the MRU side of the snowmobile trail. Both agreements cover the period between December 1st, 2012 and March 30th, 2013. Nature-based outdoor recreation activities currently promoted on the DNR-managed property include: hunting, trapping, fishing, kayaking/ canoeing, hiking snowmobiling and cross country skiing.

TNC Properties: There are buildings on TNC property at Lulu Lake although none are public use facilities. TNC parcels have small parking lots and access is by foot. No wheeled vehicles are allowed except for ADA access. The property has two dedicated trails in the 438 acre parcel immediately to the west of Lulu Lake which total 2.6 miles in length. There are volunteer trails in the same parcel which appear roughly 2.5 miles in total length. The northernmost of these trails extends north into DNR lands roughly 0.2 miles before heading west to connect with Nature Rd.

EXISTING SPECIAL DESIGNATIONS

Conservation Easement: There is a 10.35 acre conservation easement on the northeast side of Lulu Lake obtained by TNC to protect and manage a restored oak savanna and the sensitive lake shoreline.

Dedication Easement: The DNR holds dedication easements on all TNC parcels (Lulu Lake and Crooked Creek) within the project boundary. There is a third TNC parcel (Scout Road) outside the project boundary which is also considered part of the Lulu Lake SNA.

Private Ingress/Egress Easements: There is an access easement which runs north from Hwy J along Lulu Lake Road for approximately ¼ mile. At the point where the easement ends, Lulu Lake Road is co-owned by two private properties and the DNR. The DNR has a maintenance agreement with the two property owners.

There is also a DNR-only non-public management access easement which runs from a section of Nature Road between Matthew Lane and Burr Oak Trail east then south into Lulu Lake.

Utility Easement: There is a utility easement in place that runs through both the DNR and TNC managed areas of Lulu Lake. This 75-foot wide transmission line easement is located slightly south of the Waukesha/Walworth County line.

Other Easement/Agreements: There was a five year agreement which ended 03/28/13 to allow United States Geological Survey (USGS) to operate a well on TNC land for data collection[2]. The well is located near the northwest edge of Lulu Lake.

There is a right-of-use easement purchased in 1976 from Walter Zenner which runs from Jack's Bay Road and along the lower edge of private land located just south of Eagle Springs Lake. This easement is open to passive use.

CULTURAL/ARCHEOLOGICAL RESOURCES

There is one known cultural site in the Lake Lulu SNA. The Knickerbocker Ice Company had an ice house and transportation facility on the west side of Lulu Lake. However, this historical business type has not been prevalent in the United States for more than sixty years and no remnants are present at Lulu Lake.

ADMINISTRATIVE AND OTHER NON-PUBLIC USE FACILITIES AND STRUCTURES

There is a building located on the TNC-owned property that is leased to a TNC volunteer coordinator, as well as a lodge and a boathouse that is used for specially scheduled groups. The lodge and a caretaker cabin are slated for removal over the next 5 years. TNC also has garages for equipment storage.

[1] http://groundwaterwatch.usgs.gov/AWLSites.asp?S=425006088271501&ncd

SUMMARY

Ecological and Resource Management

Both the Mukwonago Unit and Lulu Lake properties offer a significant opportunity to manage a landscape mosaic of diverse habitats. The Land Legacy Report has identified the Mukwonago River and surrounding landscape as high in conservation significance. The location of these properties within the Southeast Glacial Plains Ecological Landscape provides particularly important resources for nesting and migrating waterfowl. This mosaic of waters and uplands meets the needs of many animal species which require a variety of habitat types for shelter, foraging and reproduction. By providing this diverse landscape continuum, the habitat needs for wildlife are maximized, and their safe movement from one habitat type to the next is ensured. Managing this mosaic at a landscape scale can benefit plants and animals by creating large blocks of high-quality complementary ecosystems.

RECREATION MANAGEMENT

Currently there are a limited number of recreation uses that occur on the properties. Water based recreation includes fishing, canoeing, kayaking and limited motorboat access upon Lulu Lake. Motor boat access is possible from Eagle Spring Lake. Lulu Lake has a slow no-wake requirement on motor boats. Land based recreation includes hunting, trapping, hiking, berry picking and a snowmobile trail connection to a regional trail network. A number of other nature based recreation possibilities should be considered during the master planning process, but care must be taken to protect the land and water resources from over use and degradation,

It is also important to consider the recreation connections between the Kettle Moraine State Forest – Southern Unit and the county park systems adjacent to or nearby these properties. Equally important are the connections to the local community and The Nature Conservancy lands. Altogether, these connections provide a rich opportunity to integrate the Mukwonago Unit and Lulu Lake properties into an enhanced and regionally significant nature based recreation destination for the public to use and enjoy.

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